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Specification and Drawings, as originally filed, with Application for Patent Serial No: **2,326,055** on November 15, 2000, by **REAVS INFORMATION TECHNOLOGIES LIMITED,** assignee of James A. Cole, for "Method and System For Automated Decisioning In Financial Lending Processes".

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Abstract

A method and system of automating the decision process in financial lending processes is disclosed. The application calculates a loan cap based on specific parameters and determines whether the loan is approved or requires further investigation.

METHOD AND SYSTEM FOR AUTOMATED DECISIONING IN FINANCIAL LENDING PROCESSES

Field

The invention relates generally to financial lending processes and more particularly to automated decisioning in financial lending process.

Background

Prudent lending decisions where residential properties are used as collateral demand a third party assessment of the property value. Traditionally, this has been done with appraisals.

A possible precendent can be taken from credit scoring, where algorithms incorporating background data available on individuals applying for loans has been systematic implemented in the decision process.

Prudent lending practice demands that the market value of a residential property used as collateral be validated by some means. Lending bodies have traditionally depended on appraisals to guide them in their lending decisions, and appraisals will always be a valuable tool.

In most loan applications where residential properties are used as collateral, there is sufficient equity in the property to justify the loan. The degree of due diligence necessary regarding the property depends on the value of the property, and the amount of loan requested. Traditional full appraisals are not necessary in every instance; however, prudent lending practice demands that some objective, independent, controllable risk assessment of each case be done.

Automated Valuations Models (AVM's) are becoming available, and have the potential to be a very effective tool for lending institutions. However, there has not been a general process to embed them in the lending process.

The very nature of AVM's is such that they are in many ways not as precise nor as specific as traditional methods. Since the use of the AVM directly affects lending decisions, it is essential that any such process be controllable through the risk management function of the lending institution. AVMs offer several advantages including: the ability to produce valuation instantly, and produce other information about the property and background market that would be difficult or impossible to produce manually.

Therefore, there exists a need for a systematic way to implement the safe use of modern AVM's into the lending decision, in a controlled and customized manner. It is also desirable to provide a real estate automated valuation system designed to support residential mortgage lending decisions within speific prudential guidelines incorporating a data service designed to produce past value estimates and prudent lending decisions for residential properties.

Summary

The invention is directed to a system and method for automated decisioning in financial lending processes involving AVMs.

Embodiments of the invention may have the following advantages:

> central control of business process; lower cost, both in direct savings and administration costs; faster turnaround; implement business process through automation; and lower portfolio risk, by focusing manual due diligence on those cases which are not safe enough to pass automated process.

Other aspects and advantages of the invention, as well as the structure and operation of various embodiments of the invention, will become apparent to those ordinarily skilled in the art upon review of the following description of the invention in conjunction with the accompanying drawings.

Brief Description of the Drawings

Embodiments of the invention will be described with reference to the accompanying drawings, wherein:

Fig 1. illustrates the basic automated decisioning method;
Fig 2 illustrates an example of calculation of a loan cap;
Fig. 3 illustrates the risk parameter;
Fig. 4 illustrates a value graph; and
Fig. 5 illustrates a chart illustrating how the allowable LTV is reduced.

Similar references are used in different figures to denote similar components.

Detailed Description

A systematic method of incorporating risk criteria into the lending decisions involving residential properties is disclosed. The invention is a real estate automated valuation system designed to support residential mortgage lending decisions within specific prudential guidelines incorporating a data service designed to produce fast value estimates and prudent lending decisions for residential properties. The systems used in this process is as a front end, or filter, to determine, in each case, whether a particular application can be approved immediately, or if additional scrutiny of the property is required. In general, all other credit checks and lending criteria have been satisfied, and the only remaining check is against the property.

The term "Automated Valuation Model" applies in general to a broad class of computer systems that can produce valuations of the current market value of residential properties. These systems can be quite complex in their own right, and typically involve large databases of property and sales related information.

In general, AVM's will produce the following:

1. A range of value for a particular property
2. A range of value for similar properties in close proximity
3. A single best estimate value
4. Some kind of score or estimate of the margin of error.
5. Some kind of market shift assessment

There will always be a certain amount of uncertainty in any AVM valuation, which is inherent in any mathematical prediction about a matter which is inherently variable in many cases. Traditionally, statistical inference will be measured based on many cases, and overall portfolio performance can be measured very accurately. However, there are usually statistical outlyers in any such portfolio, and that is certainly true in this area. However as precise any AVM is, as measured over any portfolio, any single valuation can be very far off, for good reason. These include errors in underlying data, underlying data is not up to date, valuation method is not applicable, special conditions which are not covered in the data. The main goal of the invention was to facilitate the use of AVM's in a safe and sound manner in the lending process, and to mitigate against these inherent difficulties.

Referring to Figs 1 to 5, the disclosed system and method's primary intended use is as a front end, or filter, in the lending process, where all other credit checks and lending criteria have been satisfied, and the only remaining check is against the property. In each case, a decision must be made whether this particular application can be approved or if

additional scrutiny of the property is required.

In general, every application, the reavs' process requires only four pieces of information:

1. The type of transaction – i.e. purchase, transfer, refinance, collateral etc.
2. The address of the property.
3. The amount of the loan.
4. The purchase price of the property, or the declared value if a non-sale transaction.

The basic process is as follows:

- The address is supplied to reavs, and it returns its calculated valuation and other relevant information for that property.
- The loan type, property value (purchase price or declared value), and loan amount are entered.
- The application returns a Yes or No response, indicating whether this particular transaction can be approved immediately, using the information available and criteria approved by the lending institution.

If the transaction is not approved, it does not mean that the application is denied. It simply means that it is not safe enough to be approved through the application alone, and that other scrutiny, such as a traditional appraisal, is required.

The loan cap value which is the end result of the calculation is intended as a precise limit to the amount of risk that is acceptable at this time, on this property, with a particular deal.

Input: AVM results

Property Value

Property High Value Limit

Property Low Value Limit

Estimated Margin of Error

Underlying Market Activity

Underlying Market Shift

Details from the loan application

Type of Loan

Declared Value of Property

Requested Loan Amount

Parameters approved by lending Institution

Type of Loan

Geographic Details

Output: LoanCap

Lending decision

The decisioning process is broken done into several components:

Property value

Loan to value which is acceptable in all cases.

A worst case scenario.

Each factor that can be systematically brought into the decisioning calculation will fall into one of the three components above. For example, the AVM value may be available, but there may not be enough recent sales to ensure a complete level of confidence in that value. In such a case, any deemed additional risk will be mitigated by lowering the allowable LTV appropriately.

The property value that is used for the loan decisioning is straightforward

the lessor of:

the declared value of the property, as provided by the applicant.

the high value limit of the AVM, or

an arbitrary value, based on the area.

If the declared value is not available, it can be taken as the best estimate, or as the low value estimate, or the average of these last two.

The down side of any AVM is generally that it cannot be guaranteed that any value that it comes with for a property is made up of current data, either about the subject property, or that all of the market values used for any analysis is value. In virtually any market, there will be some statistical variance that must be accepted as an inherent part of any automated valuation.

The application accounts for this inherent fact of AVMs by considering a worst case scenario. In effect, the question is posed: "In the unlikely event of the default of this particular loan, and this property must be foreclosed on, what potential exposure does the lending institution have, and is that acceptable?"

Each lending institution estimated this in a separate manner, based on rules of thumb that have arisen in the culture of that situation. In order to make such an estimate, the invention allows the calculation of the net exposure as the sum of the following three terms:

A factor based on the value of the property which can be zero

A factor based on the amount of the loan which can be zero

A factor which represents a fixed cost which can be zero.

In addition, the institution will set its limit to this net potential loss.

So, the loan cap which satisfies this calcuation becomes:

loan cap = Loan amount + net exposure – Low property value limit - Limit.

Once the overall loan cap is known, then approval is simply whether the requested loan amount is within the loan cap. The loan cap is generally displayed, as there may be potential to "upsell" the applicant into a greater loan.

The basic underlying process is as follows:

- The necessary data fields are input to the application.
- Using ONLY the address supplied, the application calculates a value and other relevant information for that property.
- The decisioning logic then merges the underlying the application valuations for the property with the loan details as supplied, using parameters as approved by risk, to derive the loan cap.
- If the loan amount requested is within the loan cap, the transaction is approved.

If the transaction is not approved, it does not mean that the application is denied. It simply means that it is not safe enough to be approved through the application alone, and that other scrutiny, such as a traditional appraisal, is warranted.

For every transaction, the reavs process requires only a few pieces of information:

The type of transaction – i.e. purchase, transfer, refinance, collateral etc.

The address of the property.

The amount of the loan.

The purchase price of the property, or the declared value if a non-sale transaction.

The client ID and (optionally) the department. Separate decisioning rules can be set

up for different departments within the same organization if desired.

(In actual production use, several other pieces of data will be entered into the system, such as transit number, internal reference number, source, but these are not required for the internal decisioning).

The decisioning logic focuses on determining the maximum loan amount that will be approved immediately using the application or the loan cap. It is a very useful, general-purpose dollar value that can be easily controlled and adjusted by risk management for different purposes, and yet is easy to use within the day-to-day lending process.

For reasons of safety, consistency and simplicity, the system includes a set of decisioning rules, which ultimately decide which transactions can be approved through the application alone. Risk management will specify its tolerance for risk using different control parameters which the application makes available.

The decisioning model within the applications takes into account the various values, scores and market data that the applications supplies on each valuation. While the underlying logic is complicated, the result (the loan cap) is very specific. This method allows risk management to control the process in a consistent, safe and flexible manner. The loan-to-value percentage (LTV%) for any loan request is fundamental to reaching any lending decision, and risk management has traditionally used LTV% limits as policy to control exposure to risk. The application uses a variation of this same technique to derive an approval answer in each case.

The application considers a worst case scenario, primarily to protect against markets which are not stable or where the underlying data is not consistent.

Any deal that passes the rigor of this process is considered an acceptable risk. This does

not imply that any deal that does not pass is not acceptable. It simply means that further scrutiny, perhaps a traditional appraisal, is necessary.

For every loan application, this decisioning logic is applied:

- What is a safe property value to use? Is the property value supplied reasonable? If not, what is the highest value that can be substantiated? A specific safe property value is determined.
- What LTV ratio is safe? In conventional lending, a loan can be made up to 75% LTV ratio of the property value. Is it necessary to lower this LTV ratio to mitigate against some risk? A specific safe LTV ratio is determined.
- The initial loan cap is the product of the safe property value and the safe LTV ratio.
- Finally, consider a worst case scenario. In the unlikely event of default on this property, is there sufficient equity to safely cover the loan amount and associated realization costs? A second loan cap is determined.
- The final loan cap is the lesser of the two loan cap values determined above.

This model is very rigorous, and provides a safe, controllable mechanism to use the application in the process.

The decisioning method focuses on setting safe limits, or caps, to cover a variety of concerns. For each transaction, the application goes through these calculations and decisioning logic.

Depending on the institution and application, there is a maximum allowable LTV ratio for each transaction. In conventional lending with no mortgage insurance, for example, the LTV ratio can be no more than 75%.

The application offers a variety of parameters to risk management to reduce the LTV ratio to mitigate against other factors. Risk management can control the allowable LTV based on:

- The type of transaction i.e. sale, refinance, transfer or other.
- The region
- The reavs market variance.
- The property value as it relates to its neighborhood.
- The activity in the marketplace, based on the number of sales in the last 6 months.
- The range between the reavs value and the property value.

As an example, risk may set the general maximum for the allowable LTV ratio to be 75%. However, specifically for refinances, this requirement may be tightened to allow only 65% LTV.

In general, a range of value of a residential property is typically provided. This range can certainly be used to substantiate a purchase price, or declared value, as is described earlier. The autodecisioning provides a significant extra level of safety by considering a worst case scenario.

For clarity, consider an example where the application has calculated a price range for a property as $130,000 to $171,000. Assume a refinance requesting $125,000, based on a declared value of the property of $167,000. The declared value of $167,000 is within the value range, and thus will be substantiated. Reavs effectively asks the question: "If anything goes wrong, and we have a default on this property, what risk are we taking if the property was really only worth $130,000, and is that risk acceptable?" The system does this by estimating the potential for net loss, using parameters that risk provides.

In most cases, there is little to no potential for net loss. However, in neighborhoods with

high value ranges, or with high market shifts, it is possible for the value to be substantiated and still have potential for loss. This decision model provides management to limit the amount of potential downside risk to an acceptable level.

In the case of default, realization costs must be borne by the lending institution. The application allows risk to assign their own estimate of these costs by providing the following parameters. The costs in case of default will be estimated as the sum of:

1. The principle amount of the loan multiplied by a Factor.
   The Factor here could easily be 1.0. However, this factor can be used to add in the cost associated with foregone interest, based on the institutions' internal history of defaults, and the current interest rates. So, for example, this factor could be set to 1.045
2. The value of the property multiplied by a Factor.
   The Factor in this case is intended to account for those costs which are dependent on the value of the property – i.e. MLS services can be 6%.
3. A fixed cost.
   This cost is intended to cover standard costs which are relatively fixed – i.e. which are not dependent on the value of the property or loan. These may include legal fees, or internal administration charges – could be $2,000.

A final parameter allows risk to limit the amount of net loss that is acceptable.

So, for each transaction, the application goes through these steps before a transaction is approved:

1. Calculates a validated property value.
2. Calculates an LTV ratio which satisfies all risk criteria.
3. Calculates a worst case scenario.
4. Determines a loan cap that satisfies all risk criteria, and
5. Approved the application if the loan requested is no more than the loan cap.

The loan will be approved only if the loan amount requested is less than the loan cap and the Potential Net Loss is within the threshold set by the lending institution.

The application valuation also identifies several conditions that may result in increased risk. To mitigate against each of these, the system will lower the allowable LTV percentage to a safe level which has been approved by risk. The **Safe LTV ratio** is the highest ratio that satisfies all of the separate criteria set by the lending institution to deal with each of the following condition:

1. An arbitrary limit (i.e. 75%)
2. The transaction type: i.e. purchase, transfer, collateral
3. The geographic area
4. Neighborhood real estate market activity over last 6 months
5. Neighborhood Historical High sale price
6. Reavs' Market variance
7. Range between reavs "core" value and declared value

In addition, the system also considers a worst-case scenario, in the unlikely event of a default. A net loss may occur if the value of the property on sale is insufficient to cover all realization costs, including principle. The estimate of the costs associated with realization is split into three separate components:

1. A cost based on the value of the property.
2. A cost based on the amount of the loan.
3. A fixed cost.

As an example, consider an $75,000 loan on a property valued at $100,000
Realization costs *could be* estimated as:

103.5% of $75,000 to cover principle of the loan plus forgone interest

6.5% of $100,000 to cover real estate commission

$2,345 to cover fixed costs such as legal and other expenses.

In this worst case scenario, the system assumes uses a Low Value Limit as a reasonable estimate of the value of the property which would be available on realization. The **Net Potential Loss** is this worst-case property value, less the total of the above individual costs. The lending institution can cap this potential loss within their comfort level.

As an initial example, consider a mortgaging refinancing of $75,000 against a property declared to be worth $100,000. Reavs' core value of property is $97,000, with a Value Limit range from $92,000 to $104,000.

In this initial example, the decisioning logic is applied as follows:

- What is a safe property value to use? In this case, the property has been declared to be worth $100,000. Even though reavs' core value is only $97,000, it's High Value Limit is $104,000. The safe property value used is the lessor of $100,000 and $104,000, so here is $100,000.
- What LTV ratio is safe? For the purposes of this example, we'll assume that an LTV of 75% is acceptable. A later section describes the factors that go into this determination in detail.
- The initial loan cap value is $100,000 75%, or $75,000.
- Consider a worst case scenario. In the unlikely event of an actual default, there are additional costs involved with the realization process which are estimated according to lender parameters, which are described in detail later. In this example, the total cost of realization has been determined as $87,000. The Low Value limit is used as a reasonable estimate of the worst case value of the property, in this case $92,000. The calculated loan cap that is safe is calculated as $78,000.

  The final loan cap is the lessor of $75,000 and $78,000, or $75,000.

The application provides an instant specific current estimate of value for any single property. The nature of any estimate (automated or otherwise) is such that this value cannot be guaranteed to be 100% precise. A reasonable high and low value for any single property is more important in actual use.

The value graph of Fig. 3 that appears on each report shows the core value (in this case $147,900) and how this property fits into its immediate neighborhood. It also shows a reasonable high and low value for this specific property.

The "reasonableness" of these value limits can be tailored for each application. They will reflect the underlying consistency of the market that each property is in, at the time of the valuation. Some markets are very consistent and the actual difference between the high and low ranges will be small. Other markets have significant price fluctuations, and this will be reflected in much larger value ranges.

The value limits also reflect the degree of market shift. In cases of high market shifts, both positive and negative, the value limits will be lowered, consistent with the actual amount of shift.

The high value (the High Limit) is intended to represent an 80% level – i.e. 80% of all open market prices will be below it, and it can fine tuned to ensure that this level is achieved. The Low Limit is similarly set, and it can be tuned independently of the High Limit. These high and low value limits can be set, validated and maintained based on open market data (the standard), or (more typically) on data specific to the institution. The High Value Limit, once established, can be thought of as the highest reasonable value that will allow this property to be considered in a collateral sense. It does not mean that any property that sells on the market place for more than this high limit is not worth it – there will most certainly be properties that do. However, if a specific loan demands that there be more equity then the high limit value, additional scrutiny (most likely in the

form of a traditional appraisal) is warranted.

The Low Value limit, once established, can be considered as the worst case, i.e. this property can be reasonably considered to be worth at least this value in this market. This value becomes important in considering a worst case scenario.

As an example, continuing with the $125,000 loan, and assume the Factor values above.

Realization costs would be estimated as:

1.045 of $125,000 to cover principle of the loan plus forgone interest = $ 130,625

6% of $130,000 (Low Value Limit) to cover real estate commission = $7,800

$2,000 to cover fixed costs such as legal and other expenses

So, total realization costs would be estimated at $(130,625 + 7,800 + 2,000) = $140,425. Assuming a worst case, and the property could only be sold for $130,000, then the potential net loss would be $(140,425 - 130,000) = $10,425.

This may be acceptable, or it may not - it's a risk management decision to make. The application provides risk management a parameter that sets the limit to this net potential loss that is deemed acceptable.

Again, as an example, assume that risk management limits the potential net loss to $6,000.

This decision would limit the loan amount that would be permitted on this property (the loan cap) to be:

($130,000 + $6,000 - ($130,000 * 6%) - $2,000) / 1.045 = $120,765

So, even though the declared property value is within the reasonable value limits that the application calculated for this property, the loan cap will be reduced to mitigate against the uncertainly due to the range of value.

Again, in most cases there is little to no potential for net loss. However, in neighborhoods with inconsistent sale values, or with high market shifts, there will be an inherent range of value for each property estimate due to the statistical results on the market data. This decision model provides management control to limit the amount of potential downside risk to an acceptable level.

The system's automated decisioning criteria can be adjusted to automatically approve the majority of mortgage loan applications. When these criteria are not met on a specific transaction, more traditional methods, such as appraisals, will still be used. Approval rates in production can range anywhere from 40% to over 90%. It is extremely controllable.

These parameters are assigned using a client worksheet that lists all available standard parameters, and is used for sign-off purposes. This document is available separately. Defining and setting risk parameters is complicated. The decisioning model, and the parameters that the application makes available, have evolved from analysis of thousands of production transactions. The application has guidelines for each of these parameters, and generally reviews each client's portfolio to assess the overall effect of the parameters. This process is similar to credit scoring.

The application errs on the side of caution, with the overall intent that any case that satisfies all the criteria should be considered low risk.

There tends to be different situations which risk management wants to control in different ways. For example, a purchase situation tends to be viewed differently from a refinance situation, and risk management can adjust parameters accordingly.

Each separate situation that risk management wants to identify is given a Type designation, with its own set of parameters. In addition, each client can identify different

transaction Types within different Departments, all within the same organization. Finally, the rules can be different again geographic region. At the time that the transaction is processed, the Department and Type are identified, and the Region is derived from the property address. Parameters that have been defined for that particular Department/Type/Region will be used. As many separate Department/Type/Region combinations as desired can be maintained.

Following is a detailed description of the risk parameters and illustrates in Fig. 4.

Client

Client code as agreed between client and reavs.

Department

Client "department" code, as agreed between client and reavs. A large lending institution may have several risk departments, each with its own jurisdiction, and this extra designation allows separate risk parameters to be maintained. The term "department" should be taken in a broad sense to mean any separate part of the whole organization

Transaction Type

A single code for the transaction type, within the department. Typically:

1. Purchase
2. Refinance
3. Transfer
4. Collateral, where lender holds first mortage
5. Collateral, where lender does not hold first mortgage

Region

Different parameters may be defined based on regions, where any region is a set of defined municipalities. For example, a separate set of rules can be determined for the

GTA, within Ontario.

Maximum Property Value

This is the maximum allowable property value for which loans can be approved.

Maximum Loan Amount

This is the maximum loan dollar amount that can be approved through the use of reavs.

Collateral LTV Limit

A collateral situation is handled differently in production, as an outstanding 1st mortgage amount must be entered and will be used in the end approval.
This parameter is used to limit the allowable LTV% for the first mortgage. For example, if set to 50%, this would limit the allowable first mortgage amount to 50% of the value of the property.

High Value Factor

In each property valuation, reavs calculates a reasonable range of value, with a specific low and high value limits. This factor is used to fine-tune the high value limit, to trap a desired percentage of the overall marketplace, based on a known set of actual consistent purchase transactions.

This factor is made available to risk management as it significantly influences the approval process. It is set based on detailed portfolio analysis of production cases, in consultation with the application.

Low Value Factor

Similar to the preceding parameter, this factor is used to fine-tune the low value limit.

Market Shift Cap

The decisioning automatically adapts to fluctuating markets. For each neighborhood and

property type, the application derives a market shift, which represents the percentage overall shift in that market from the same time last year. This shift affects both the high and low value limits which reavs calculates.

This factor caps the amount that any positive change in market shift will be allowed to affect the value limits.

As an example, the overall market shift in a province can be measured to be 2%. However, in specific markets, measured shifts have been seen as high as 40%. This parameter limits the amount that a positive shift will be allowed to influence the value limits – it is intended to control automatic approvals where property values have risen dramatically.

Again, this parameter is set based on consultation with the application – 5% is typical.

Worst Case Scenario Parameters

As described above, the decisioning process assesses the exposure to a potential loss in event of default. The total realization required is estimated as the sum of 3 separate costs:

Cost related to Loan: Loan amount * Factor

The Factor here could easily be 1.0. However, this factor can be used to add in the cost associated with foregone interest, based on the institutions' internal history of defaults, and the current interest rates. So, for example, this factor could be set to 1.045

Cost related to Property: Property value * Factor.

The Factor in this case is intended to account for those costs which are dependent on the value of the property – i.e. MLS services can be 6%.

Cost which is fixed

This parameter defines standard costs which are relatively fixed – i.e. which are not dependent on the value of the property or loan. These may include legal fees, or internal administration charges – could be $2,000.

Maximum Allowable Potential Net Loss

This parameter defines the maximum exposure to any derived Potential Net Loss that risk will accept, and is typically in the order of $5,000 to $20,000.

LTV% Cap Parameters

Depending on the institution and application, there is a maximum allowable LTV ratio for each transaction. In conventional lending with no mortgage insurance, for example, the LTV ratio can be no more than 75%.

The application offers a variety of parameters to risk management to reduce the LTV ratio to mitigate against certain factors.

The application derives a "core value" in each valuation, which represents the single best estimate of the value of each property. The reavs range is the percentage difference between this "core value" and the property value as supplied in the transaction details. If this range is small, there is little doubt that the property value as supplied. As this range increases, there is increasing doubt that the property value as supplied is reasonable. As the range increases, the allowable LTV% of any loan against the property can be decreased based on the parameters set by the user.

The following chart of Fig. 4 shows how the allowable LTV in any loan situation can be reduced as the range increases. These can be set differently based on whether the property value as entered is higher or lower than the calculated the value. The middle vertical line on the chart represents a the range of 0% - that is, there was no difference between reavs' predicted value and the property value as supplied. The parameters to the right of the

vertical line, which are labeled as "High ...", represent the situation where the property value is higher than the value.

Each of the high and low ranges is further split into 3 smaller, in which the LTV% will be capped based on the parameters set by the user.

High LTV Cap

This is the highest LTV allowed through the use of the application, if the property value is higher than reavs. It's generally set at 75%, as in the example.

High Range 1 Limit

This is the upper limit to range 1, which allows the High LTV Cap. In the example, this is set to +16%, and means that if the property value is above the reavs value, but within 16% of the value, then loans of up to 75% LTV can be approved

High Range 2 LTV Cap and High Range 2 Limit

These two parameters, taken together, are used to reduce the allowable LTV based on the range over the High Range 1 Limit. At the specified range, the LTV will be set to the LTV limit. Between the Range 1 and Range 2 limits, the allowable LTV will be reduced proportionally until, as shown, it reaches the set LTV limit.

Looking at the example, the High Range 1 Limit is 28%, and High Range is 63%. As the range increases over 16% the allowable LTV will be decreased proportionately, until at a 28% range, it will be 63%.

High Range 3 LTV Cap and High Range 3 Limit

These two parameters work together exactly as the two Range 2 parameters, with the exception that they take effect above the High Range 2 Limit. Based on the example, for any range more than 28%, the LTV will be reduced proportionately, so that at a range of 40%, an LTV of 45% will be allowed.

Low LTV Cap, Low Range 1 Limit

These two parameters work exactly as described for the High LT V Cap and Range Limit, except they come into play when the property value is lower than the reavs value. In the example, the Low LTV Cap of 75% will be allowed if the property value is lower than the reavs value, up to a range of –15%.

Low Range 2 LTV Cap, Low Range 2 Limit, Low Range 3 LTV Cap, Low Range 3 Limit

These four parameters work exactly as previously described for the high ranges, except that they come into play if the property value is lower than the application value.

These ranges are intended to allow risk management to control the use of the application system by lowering the allowable LTV's in a controlled manner as the range between market values and reavs values may increase. If the application predicts a real market value within a reasonable range, then it substantiates that market value. If that range is higher, there is more doubt so the allowable LTV is reduced to a comfortable level.

For both High and Low, the Range 2 is intended to slowly reduce allowable LTV, and Range3 more so.

Market Variance

The market variance is a score which reavs provides on each valuation. It is a proven indicator of the consistency, of the underlying market data. In general, the lower the market variance, the better the application value will be. The allowable LTV is preferably reduced based on the market variance, in three separate thresholds:

If the market variance is less than .20, the LTV% cap is 75%.

If the market variance is less than .30, the LTV% cap is 70%.

If the market variance is less than .40, the LTV% cap is 65%.

The application reports the highest actual sale of file for similar properties in the same neighborhood. In general, if a property value is close to or more than the historical high, further scrutiny is desirable. LTV caps can be set based on how any property value compares to the neighborhood high value.

If the property value is less than 101% of the neighborhood high, the LTV Cap is 75%.

If the property value is less than 105% of the neighborhood high, the LTV Cap is 70%.

If the property value is less than 110% of the neighborhood high, the LTV Cap is 65%.

The above setting would mean that no application will be immediately approved if the property value is greater than 110% of the historical high in the reavs' neighborhood.

The application is constantly updated with all registered sales. Good valuations demand relevant recent sales. A recent sale is defined as one that is consistent in the neighborhood, and which has occurred within 6 months of the effective date of the transaction. The application produces valuation as long as there are sufficient sales on record; however, there can be less certainty about any current situation if there are relatively few recent sales. The allowable LTV can be reduced if the number of recent sales falls below a set threshold.

If the ratio of recent sales to the number of properties is less than 2%, the LTV Cap is 65%.

The application calculates a high value limit based on indexes calculated for each property within its own neighborhood. This high value limit reflects the price distribution

within the neighborhood, the variance of the historical pricing, and the calculated market shift. This factor is used to fine adjust the high value limit, to trap a desired percentage (80%) of the overall marketplace, based on a known set of actual consistent purchase transactions. This factor is .85.

Similarly the low value limit is used to fine tune the low value limit, to trap the desired percentage (80%) of the overall market. This factor is .60.

For each neighborhood and property type, the application calculates a market shift, which represents the percentage overall shift in that market from the same time last year. This shift affects both the high and low value limits which reavs calculates. This factor caps the amount that any change in market shift will be allowed to affect the value limits. This cap is set at 5%.

For each transaction, the application assumes a worst case and calculates a potential loss in event of a default. The total realization required in event of default is estimated based on the total of 3 separate costs:

1. A percentage of the loan value, set at 105%
2. A percentage of the value of the property, set at 6.5%
3. A fixed value of $2000

The maximum allowable potential loss is $7500.

LTV Caps based on the application range.

The market variance is generally considered an indication of how good or consistent the underlying data is in the neighborhood. As such, it is an excellent indicator of how good any result can be expected to be. The lower the market variance, the better the reavs'

value can be expected to be.

1. If the market variance is less than .20, the maximum allowable LTV% is 75%.

2. If the market variance is less than .30, the maximum allowable LTV% is 70%.

3. If the market variance is less than .40, the maximum allowable LTV% is 60%.

The application reports the highest actual sale on file for similar properties in the same neighborhood. LTV% caps can be assigned based on how any property value compares to the neighborhood high value.

1. If the property value is less than 100% of the neighborhood high, the LTV Cap is 75%

2. If the property value is less than 105% of the neighborhood high, the LTV Cap is 73%

3. If the property value is less than 110% of the neighborhood high, the LTV Cap is 66%.

The application tracks the number of recent sales in each neighborhood, defined as one that is consistent in the neighborhood, and which has occurred within 6 months of the effective date of the valuation.

If the ratio of recent sales to properties is less than 0%, the LTV% Cap is 75%.

The previously described embodiments of the present invention have many advantages including: central control of business process; lower cost, both in direct savings and administration costs; faster turnaround; implement business process through automation; and lower portfolio risk, by focusing manual due diligence on those cases which are not safe enough to pass automated process.

The application valuations have been designed to be conservative, to find the typical or normal value within a neighborhood. Specific design criteria were developed to ensure that the overall system performed in a safe, reliable manner. The system has been heavily scrutinized and validated by several outside organizations.

The application valuations are based to a large extent on tax assessments for similar properties within the same neighborhoods. The assessments assigned by the province are by their very nature market-based, consistently applied, and constantly maintained.

The application valuations also use the most up-to-date, and complete sales data commercially available, derived from the legal documentation filed with the land registry offices each time there is a change of title for any property. This guarantees that the valuations are based on an analysis of 100% of the actual market.

Application values have been demonstrated to be accurate and reliable predictions of market prices over several years and tens of thousands of test cases. Many independent studies have been done and all have confirmed reavs.

Each report is a full statistical analysis based on a large volume of current raw data, typically involving hundreds of properties and sales within a neighborhood. All sales for at least the last three years are on record and available.

The application is consistent. The same valuation and decisioning calculations are applied

for every property, in every neighborhood. It provides a standardized measure of the reasonableness of a market value.

The application is also objective. No opinion or exceptions are possible. It cannot be swayed or influenced by emotions or personal prejudices.

The application predicts its values. No outside data other than the address of the subject property is required. It cannot be manipulated.

The application is rigorous. Each valuation and decisioning calculation must pass through many internal criteria, all in place to ensure that the system is safe and sound. There must be sufficient sales data available before a valuation is provided. There must be historical precedent in the neighborhood to validate a market price. A measure of the underlying suitability of each neighborhood is provided with each neighborhood.

The decisioning rules for reavs are completely controllable by the lending institution.

Management can change lending criteria "in the back", without affecting the ongoing process.

The application is simple to use and to integrate into existing processes, minimizing the potential for human error.

Because the application is automated, its results can be centrally monitored and controlled.

All transactions are maintained by the system, and an audit trail is available in the form of a CD each month.

Since the details of all transactions are maintained on the system, it is capable of providing risk related information and reports. An accurate Geographic Information System is an inherent part of the whole system; loan analysis by geographic region is available.

Further the application is not AVM dependent, which means that multiple AVM's can be implemented across various jurisdictions and lends itself to automated implementation through systems. The application offers risk management control based on underlying market conditions, in a manner that is not possible through traditional methods and lowers overall portfolio risk, by focusing extra due diligence on those cases which are deemed to be higher risk.

While the invention has been described according to what are presently considered to be the most practical and preferred embodiments, it must be understood that the invention is not limited to the disclosed embodiments. Those ordinarily skilled in the art will understand that various modifications and equivalent structures and functions may be made without departing from the spirit and scope of the invention as defined in the claims. Therefore, the invention as defined in the claims must be accorded the broadest possible interpretation so as to encompass all such modifications and equivalent structures and functions.

What is claimed is:

1. A system automated decisioning comprising:

   means to receive data fields;

   means to calculate a property value;

   means to calculate a loan cap; and

   means to either approve or reject the loan based on the loan cap.

2. A method of automated decisioning comprising the steps of:

   inputting data fields into the application;

   calculating a property value;

   calculating a loan cap; and

   approving the transaction if the loan is within the loan cap.

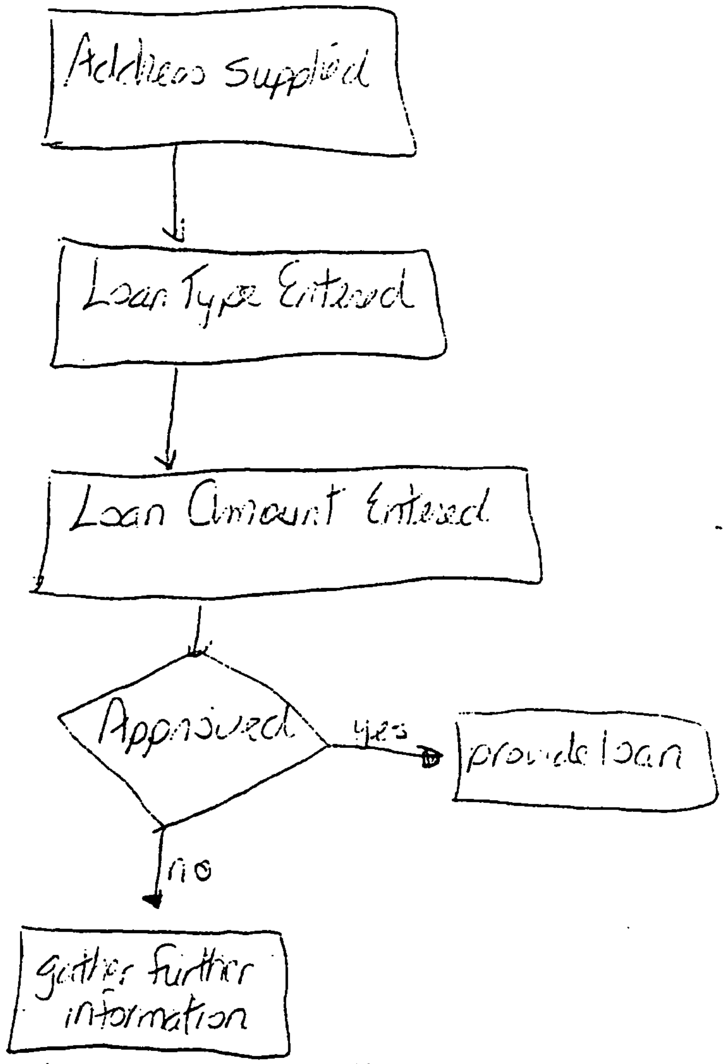
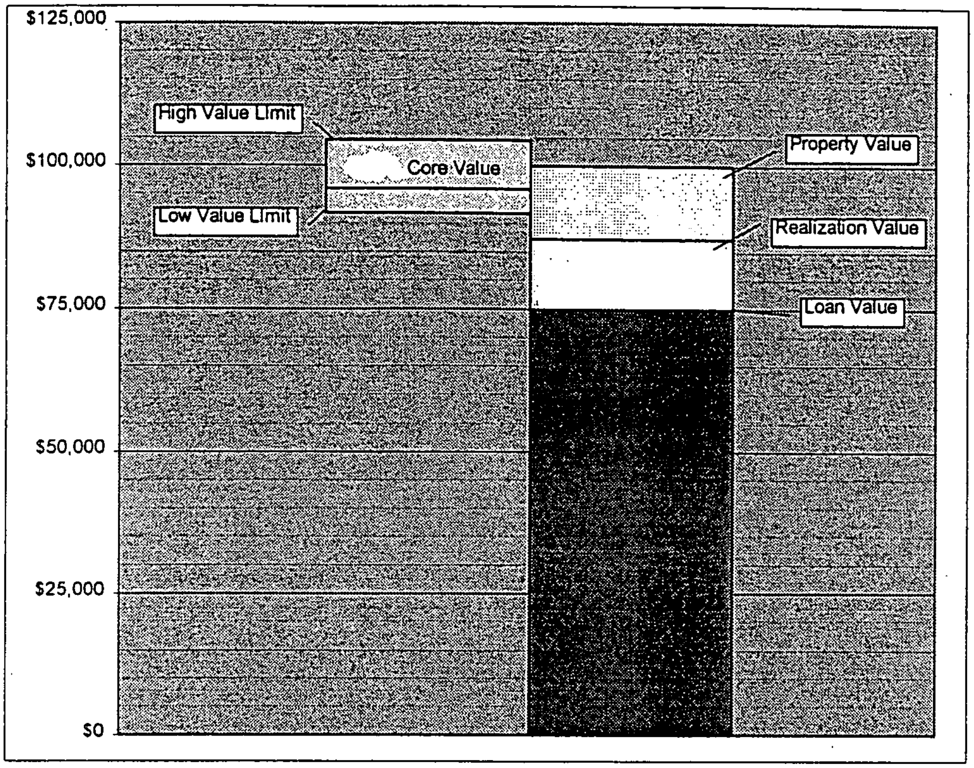

Address supplied
Loan Type Entered
Loan Amount Entered
Appraised
yes
provide loan
no
gather further information

Figure 1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$75,000
$50,000
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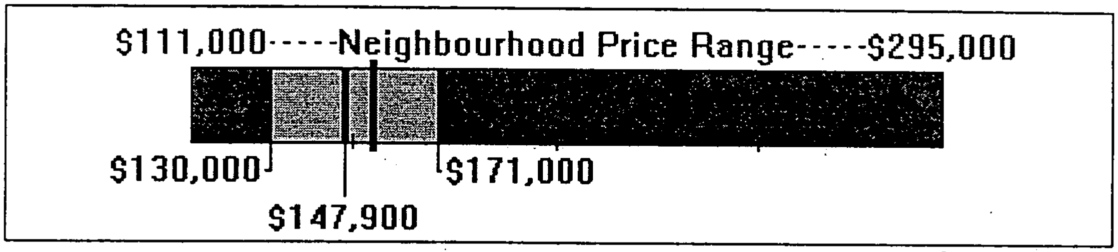
$0
High Value Limit
Core Value
Low Value Limit
Property Value
Realization Value
Loan Value

FIG. 2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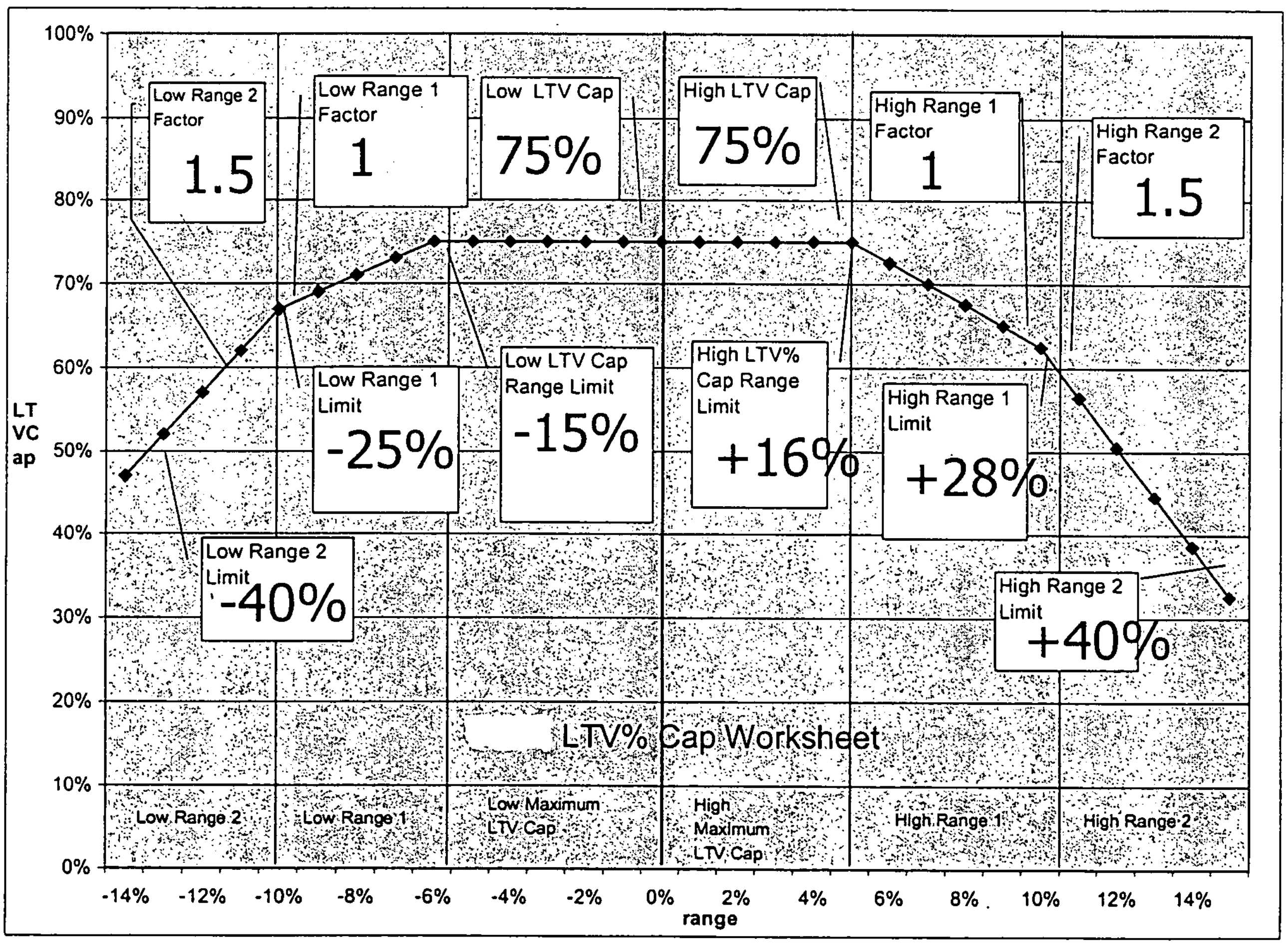
$130,000
$171,000
$147,900

FIG. 3



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80%
70%
60%
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40%
30%
20%
10%
0%
LT VC ap
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1.5
Low Range 1 Factor
1
Low LTV Cap
75%
High LTV Cap
75%
High Range 1 Factor
1
High Range 2 Factor
1.5
Low Range 1 Limit
-25%
Low LTV Cap Range Limit
-15%
High LTV% Cap Range Limit
+16%
High Range 1 Limit
+28%
Low Range 2 Limit
-40%
High Range 2 Limit
+40%
LTV% Cap Worksheet
Low Range 2
Low Range 1
Low Maximum LTV Cap
High Maximum LTV Cap
High Range 1
High Range 2
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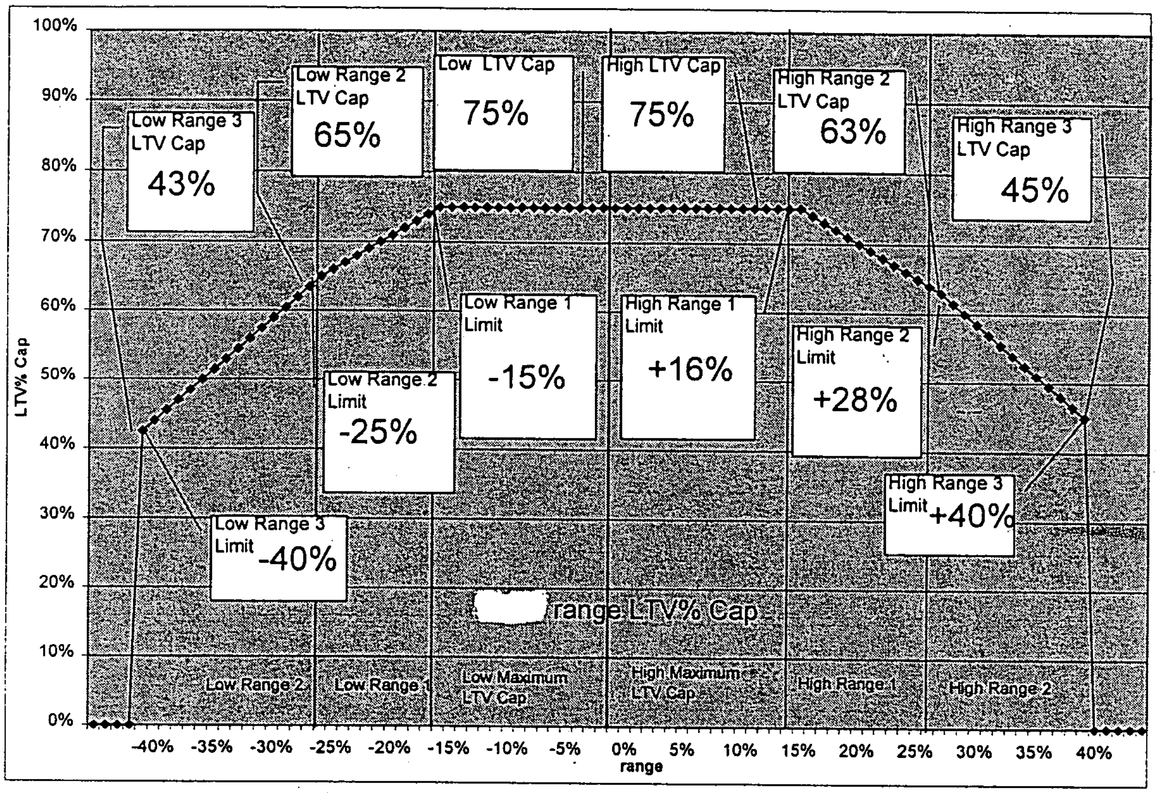
-12%
-10%
-8%
-6%
-4%
-2%
0%
2%
4%
6%
8%
10%
12%
14%
range

Fig. 4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80%
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50%
40%
30%
20%
10%
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LTV% Cap
Low Range 3
LTV Cap
43%
Low Range 2
LTV Cap
65%
Low LTV Cap
75%
High LTV Cap
75%
High Range 2
LTV Cap
63%
High Range 3
LTV Cap
45%
Low Range 1
Limit
-15%
High Range 1
Limit
+16%
High Range 2
Limit
+28%
Low Range 2
Limit
-25%
High Range 3
Limit
+40%
Low Range 3
Limit
-40%
range LTV% Cap
Low Range 2
Low Range 1
Low Maximum
LTV Cap
High Maximum
LTV Cap
High Range 1
High Range 2
-40%
-35%
-30%
-25%
-20%
-15%
-10%
-5%
0%
5%
10%
15%
20%
25%
30%
35%
40%
range

Fig. 5